NON-PUBLIC?: N
ACCESSION #: 9111040168
LICENSEE EVENT REPORT (LER)

FACILITY NAME: THREE MILE ISLAND, UNIT 1 PAGE: 1 OF 4

DOCKET NUMBER: 05000289

TITLE: REACTOR TRIP DURING TURBINE VALVE TESTING DUE TO INADEQUATE
PROCEDURE
EVENT DATE: 09/27/91 LER #: 91-003-00 REPORT DATE: 10/28/91

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 13

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: D.V. HASSLER, TMI-1 LICENSING ENGINEER TELEPHONE: (717) 948-8833

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On September 27, 1991 during plant shutdown for the 9R outage reactor power was stablized at 13% to support completion of turbine valve tightness testing and a special test of the turbine overspeed mechanical trip device. The turbine load limit control was turned to the minimum setting to close the turbine control valves and begin the tightness test while the stop valves remained open. The control valves closed as expected and the turbine decelerated indicating the leak tightness of the valves. After about seven minutes of deceleration, the turbine speed was 1200 rpm. In accordance with procedure, the CRO selected the "FAST" acceleration rate on the turbine control panel and turned the load limit control to maximum setting. The turbine control valves immediately started opening rapidly and OTSG pressure began dropping rapidly. Approximately ten seconds later at 18:37, the turbine tripped on

overspeed. Subsequently, main feedwater was isolated to both OTSGs due to low OTSG pressure and both Emergency Feedwater Trains were auto initiated due to the low OTSG levels. The reactor tripped at 18:38 on high pressure. Normal feedwater flow to the OTSG's was re-established and post trip response was considered normal.

The NRC was notified in accordance with 10 CFR 50.72(b)(2)(ii).

END OF ABSTRACT

REACTOR TRIP DURING TURBINE VALVE TESTING DUE TO INADEQUATE PROCEDURE

I. PLANT OPERATING CONDITIONS BEFORE THE EVENT

TMI-I was operating at 13% power following a normal reduction from 95% power. Plant shutdown to begin the 9R outage was in progress. The main generator TB/TG!* was off-line and the turbine TA/TRB! was operating at 1800 rpm.

Main turbine valve tightness testing was in progress in accordance with Operations Surveillance (OPS) S294; a special test (STP #1-91-0045) on the turbine overspeed trip device was to follow.

II. STATUS OF STRUCTURES, COMPONENTS OR SYSTEMS THAT WERE INOPERABLE AT
THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT.

No structures, components or systems were inoperable at the start of the event which contributed to the event.

III. EVENT DESCRIPTION

At 18:22 on September 27, 1991, the main generator breakers TB/BKR! were opened manually following a normal power reduction from 95% to 13% prior to plant shutdown for the 9R Refueling Outage. Reactor power was stabilized at 13% to support completion of turbine valve tightness testing (OPS-S294) and a special test of the turbine overspeed mechanical trip device (STP #1-91-0045) while the turbine was still at rated speed.

AT approximately 18:29, in accordance with OPS-S294, the turbine load limit control was turned to minimum setting to close the turbine control valves and begin the tightness test while the stop

valves remained open. The control valves closed as expected and the turbine decelerated thus the leak tightness of the valves was verified.

After approximately 7 minutes of deceleration, the turbine speed was 1200 rpm. Control valve tightness was accepted as satisfactory at this speed. In accordance with OPS-S294, the Control Room Operator (CRO) selected "FAST" acceleration rate on the turbine control panel and turned the load limit control to maximum setting. The turbine control valves immediately started opening rapidly. The CRO's noticed Once-Through Steam Generator (OTSG) SB/SG! pressure dropping rapidly. Approximately ten seconds later at 18:37:02 the turbine tripped on overspeed.

AT approximately 18:37:01 the Heat Sink Protection System (HSPS) SJ! isolated main feedwater SJ/-! to both OTSGs due to low (<600 psig setpoint) OTSG pressure. Approximately 12 seconds later at 18:37:13 both Emergency Feedwater Trains BA/-! auto-started due to low (

At 18:37:28 the Reactor Coolant Spray Valve AB/V! opened on high Reactor Coolant System (RCS) AB/-! Pressure. At 18:38:01 the Reactor Protection System JC/-! automatically tripped the Reactor on a valid high RCS pressure signal. Control Room personnel responded per Reactor Trip Procedure 1210-1 to stabilize the plant Normal feedwater flow to the OTSGs was established and the post trip response was considered normal.

The cause of this event was determined to be improper and inadequate procedural guidance. Procedure OPS-S294 controlling valve tightness testing was incorrect in that it required opening the load limit control while a large speed error existed in the turbine control system. Rapid control valve opening was the designed response of the turbine valves to the conditions and sequence set up by the procedure.

Review of the Vendor Manual (VM-TM-0209) guidance covering turbine valve tightness testing disclosed the vendor recommended test procedure had been revised prior to the establishment of the current GPU Nuclear Vendor Document Control Program in 1985. The revised test sequence in the Vendor Manual incorporated a step to depress the "close valves" pushbutton thereby assuring speed error signals in the turbine control system were reset to zero prior to restoring the load limit control to maximum. This revised vendor guidance had

not been incorporated into OPS-S294. Failure to incorporate appropriate guidance into plant procedures was the root cause of this event.

The NRC was notified in accordance with 10 CFR 50.72(b)(2)(ii). This event is reported in accordance with 10 CFR 50.73(a)(2)(iv).

IV. COMPONENT FAILURE DATA

There were no component failures associated with this event.

V. AUTOMATIC OR MANUAL INITIATED SAFETY SYSTEM RESPONSES

All safety systems functioned in accordance with their design. The HSPS isolated feedwater to both OTSGs due to low OTSG pressure caused by rapid opening of the turbine control valves. EFW properly auto-started on low OTSG levels. The main turbine overspeed protection device functioned to limit maximum speed to an acceptable level of 1976 rpm. The Reactor Protection System automatically tripped the Reactor on a valid high RCS pressure signal.

VI. ASSESSMENT OF THE,SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

All safety systems performed as designed. There was no adverse safety consequences as a result of this incident. Momentary loss of main feedwater flow to the OTSGs resulted in an increase in Reactor pressure. The Reactor Protection System automatically tripped the Reactor on a valid high RCS pressure signal. This was followed by a normal post-trip response.

VII. PREVIOUS EVENTS OF A SIMILAR NATURE

None.

VIII. CORRECTIVE ACTION PLANNED

A review, by the turbine vendor and GPU Nuclear technical personnel of the turbine control system verified turbine valve response was normal for the conditions established by the procedure. No additional testing or troubleshooting of the turbine controls is necessary.

An evaluation of mechanical stresses imposed on the turbine by the

rapid acceleration during this event was conducted. It was determined that no turbine components were subjected to stresses in excess of their designed capability.

Valve tightness testing procedure OPS-S294 will be revised to include the proper vendor guidance on test sequencing. In addition, plant procedure 1106-1, Main Turbine Generator Operating Procedure, will be revised to be the controlling document governing this test. These revisions are expected to be complete by March 1, 1992.

All Operational Surveillance procedures containing evolutions which can potentially affect plant operation will be reviewed to assure vendor guidance has been evaluated and that those evolutions are controlled by an appropriate governing procedure. The reviews will be completed prior to startup from the 9R Outage. Incorporating vendor guidance into governing procedures will be completed prior to the next scheduled use of the procedure and with all identified procedure revisions completed by March 1, 1992.

* The Energy Industry Identification System (EIIS), System Identification (SI) and Component Function Identification (CFI) Codes are included in brackets, "SI/CFI!", where applicable, as required by 10 CFR 50.73(b)(2)(ii)(F).

ATTACHMENT 1 TO 9111040168 PAGE 1 OF 1

GPU Nuclear Corporation
GPU Nuclear Post Office Box 480
R
ute 441 South
Middletown, Pennsylvania 17057-0191
717 944-7621
TELEX 84-2386
Writer's Direct Dial Number:
(717) 948-8005

October 28, 1991
C311-91-2133

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Dear Sir:

Subject: Three Mile Island Nuclear Station, Unit 1 (TMI-1)

Operating License No. DPR-50
Docket No. 50-289
LER 91-003-00

This letter transmits Licensee Event Report (LER) 91-003-00 which addresses the September 27, 1991 reactor trip during turbine valve testing. Public health and safety were not affected.

This LER is being submitted pursuant to 10 CFR 50.73. The attachments include NRC Form 366 which provides a brief description of the event while a complete event description is reported on the Form 366A.

Sincerely,

T. G. Broughton
Vice President and Director, TMI-I

DVH/mkk

Attachment

cc: Region I Administrator
TMI-1 Senior Project Manager
TMI Senior Resident Inspector

GPU Nuclear Corporation is a subsidiary of General Public Utilities Corporation

*** END OF DOCUMENT ***